UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte PHUI QUI NGUYEN,
KLAUS TAENNERT, and MARTIN WULF

Appeal 2008-1927
Application 10/722,796
Technology Center 1700

Decided: April 29, 2008

Before CHUNG K. PAK, CHARLES F. WARREN, and
THOMAS A. WALTZ, *Administrative Patent Judges*.

WARREN, *Administrative Patent Judge*.

DECISION ON APPEAL

Applicants appeal to the Board from the decision of the Primary Examiner finally rejecting claims 1 through 6, 8, and 9 in the Office Action mailed November 21, 2005 (Office Action). 35 U.S.C. §§ 6 and 134(a) (2002); 37 C.F.R. § 41.31(a) (2007).

We reverse the decision of the Primary Examiner.

Claim 1 illustrates Appellants' invention of a process for multi-layer coating, and is representative of the claims on appeal:

1. A process for multi-layer coating of vehicles and vehicle parts which comprises the steps of applying at least two coating layers and curing of the applied coatings;

wherein at least one of the coating layers is formed from a coating composition comprising a binder system of resin solids wherein the resin has free-radically polymerizable olefinic double bonds, hydrolysable alkoxysilane groups, and hydroxyl groups, wherein the resin solids content of the coating composition has an equivalent weight of C=C double bonds of 200 – 2000 and has a silicon content of 1 – 10 wt-%, wherein the silicon is bound in alkoxysilane groups and wherein the step of curing of the at least one coating layer comprises exposure to thermal energy thereby polymerizing the C=C double bonds via free radical polymerization and exposure to moisture thereby forming siloxane bridges from the alkoxysilane groups.

The Examiner relies on the evidence in these references of record (Ans.[1] 3-4):[2]

Murase	US 4,246,368	Jan. 20, 1981
Gaglani	US 5,312,943	May 17, 1994

[1] We consider the Answer mailed November 1, 2007, the Appeal Brief filed August 23, 2007, and the Reply Brief filed November 19, 2007, all in response to the Remand To The Examiner by the Board mailed July 12, 2007.

[2] We have not considered the United States Patents and Published Applications cited by the Examiner in argument intended to provide factual foundation to support the grounds of rejection (Ans. 4, 15, 18, and 19), which, with the exception of Young et al., do not appear to be of record and none are included in the statement of any ground of rejection. As such, reliance on this evidence is improper. *See In re Hoch*, 428 F.2d 1341, 1342 n. 3 (CCPA 1970); *cf. Ex parte Raske*, 28 USPQ2d 1304, 1304-05 (BPAI 1993). Similarly, we have not considered the non-patent literature from journals and websites submitted with the Appeal Brief and cited by Appellants (App. Br. 14-15 and 21) which do not appear to be of record. *See* 37 C.F.R. § 41.33(d)(2) (2007).

Mizutani	US 5,780,530	Jul. 14, 1998
Wu	US 6,039,872	Mar. 21, 2000
Maag	US 6,333,077 B1	Dec. 25, 2001
Bergstrom	US 6,384,125 B1	May 7, 2002

Appellants request review of the following grounds of rejection (App. Br. 4) all advanced on appeal:

claims 1, 3, 5, and 6 under 35 U.S.C. § 102(b) as anticipated by Mizutani and Wu (Ans. 5);

claims 1 through 6 and 9 under 35 U.S.C. § 103(a) as unpatentable over Mizutani in view of Wu (Ans. 6);

claims 1 through 6, 8, and 9 under 35 U.S.C. § 103(a) as unpatentable over Gaglani in view of Murase, further in view of Wu, and further in view of Bergstrom (Ans. 7); and

claims 1 through 6, 8, and 9 under 35 U.S.C. § 103(a) as unpatentable over Maag in view of Gaglani, further in view of Wu, and further in view of Bergstrom (Ans. 11).

Appellants argue the claims in each ground of rejection as a group with the dependent claims standing or falling within independent claim 1. App. Br. 11, 12, 16, and 17. Thus, we decide this appeal based on claim 1. 37 C.F.R. § 41.37(c)(1)(vii) (2007).

With respect to the grounds of rejection based on Mizutani and Wu, the Examiner contends, among other things, that Mizutani discloses a composition containing silicone polyol resin having hydroxyl groups, alkoxysilane groups and a carbon-to-carbon unsaturated function that includes C=C double bonds, which would undergo the claimed free radical polymerization and moisture curing reactions as claimed because the reference process employs thermal energy and air moisture curing conditions. Ans. 5-6 and 13-14, citing Mizutani, e.g. col. 3, l. 51 to col. 4,

l. 15 (acrylic polyol resin) and col. 5, ll. 47-64 (silicone polyol resin). The Examiner contends although Mizutani does not expressly disclose the baking conditions of up to 240°C taught therein would thermally polymerize the double bonds of the silicone polyol resin, such bonds "are known to be chemically liable and cleave forming free radicals" with thermal energy as evinced by Wu. Ans. 6-7, citing Wu col. 12, ll. 4-36. The Examiner contends the claimed curing mechanisms are inherent in Mizutani because the reference coating composition with silicone polyol resin contains the same functional groups as claimed and is cured at the same conditions as claimed, "namely, thermally and exposure to air." Ans. 14-15, (original emphasis omitted). The Examiner further contends Wu discloses that acrylate monomers can be cured with thermal energy at 18°C to 50°C in the presence of thermal initiators, and thus, it would have been obvious to one of ordinary skill in this art to conduct the baking of the composition at a lower temperature than taught in Mizutani to free radical cure the coating layer in view of Wu's teachings. Ans. 6-7. Thus, the Examiner concludes Mizutani would have prima facie anticipated and the combination of Mizutani and Wu would have prima facie rendered obvious the claimed process. Ans. 6 and 7.

Appellants contend in Mizutani's process, the silicone polyol resin is not cured by moisture but by reaction of the hydroxyl groups with functional groups in the curing agent, and the optional C=C double bonds chemically combine the silicone polyols with other polyol resins which then react with the curing agent. App. Br. 9-10, citing Mizutani col. 6, ll. 25-32. Appellants contend that while Wu discloses that radical polymerization can occur by heat, nothing in Wu establishes that such polymerization inherently occurs

in the process of Mizutani. App. Br. 10. Appellants contend the "C=C groups are disclosed only in connection with the silicon polyols and not for the other polyols," and these groups are not available for radical polymerization as a curing mechanism with the silicon polyols as evinced by a silicon polyol with incorporated C=C double bonds via maleic anhydride that is polymerized with unsaturated monomers in Mizutani's Example 7. Reply Br. 3-4.

With respect to the grounds of rejection based in part on the combination of Gaglani and Bergstrom, the Examiner contends, among other things, Gaglain does not disclose a binder that has hydroxyl groups (-OH) as required by claim 1, and finds Bergstrom discloses hydroxyl groups bonded to silicon atoms, that is, silanol groups (Si-OH), are functionally equivalent to alkoxy groups (-OR) bonded to silicon atoms, that is, alkoxysilane groups (Si-OR), for providing moisture curing of organosilicon films. Ans. 10, 12-13 and 17-18. The Examiner contends that upon exposure to moisture "some amount of hydroxyl groups would be present in the resin . . . since alkoxy groups bonded to silicon atoms would hydrolyze to hydroxyl groups bonded to silicon atoms" and "[t]herefore, the presence of hydroxyl groups in the resin . . . would be obvious even without applying teaching of Bergstrom." Ans. 16-17 (original emphasis omitted). The Examiner contends the claims do not require single hydroxyl groups that are not reactive, are linked to the backbone of the binder, and do not participate in curing, pointing out that limitations from the Specification are not read into the claims. Ans. 17-18. The Examiner contends the "hydroxyl groups as claimed read on hydroxyl groups of any type, i.e., it is irrelevant to which atom they are linked." Ans. 18. The Examiner thus concludes one of

ordinary skill in the art would have substituted some of the alkoxy groups bonded to silicon of Gaglani's binder with hydroxyl groups with the reasonable expectation that such a hydroxyl substituted binder would function in the moisture curing step as taught by Bergstrom. Ans. 10 and 12-13.

Appellants contend Bergstrom does "not teach that hydroxyl groups are functionally equivalent to alkoxy groups for providing moisture curing." Appellants contend Bergstrom's hydroxyl groups are bonded to silicon as silanol groups which "participate in curing," while the claimed binder has, in addition to alkoxysilane groups, single hydroxyl groups that are "linked to the backbone of the binder," "are not hydrolysable," and do not participate in curing. App. Br. 14 (original emphasis omitted); *see also* App. Br. 17. Appellants acknowledge that in the presence of water, alkoxysilane groups are hydrolyzed to silanol groups which condense to form siloxane bridges (Si-O-Si). App. Br. 17, citing Specification 4:34-5:2; *see also* App. Br. 14. Appellants contend claim 1 clearly indicates that hydroxyl groups are required in the binders and the disclosure in the Specification shows "alcoholic hydroxyl groups are introduced and not silanol groups," wherein "the additionally present hydroxyl groups have a catalytic action on moisture curing and can also react with the alkoxysilane groups under condensation, clearly indicating that separate hydroxyl groups must be present." App. Br. 10 (original emphasis omitted); Reply Br. 4, (original emphasis omitted). In reply to the Examiner's contention at Answer 17-18, Appellants contend

> even if intermediate reaction stage alkoxy silane groups would be present parallel to not finally reacted silanol groups in the binder of Gaglani (what is only an assertion of the Examiner), the actual initial binder to be used in the coating composition of

> Gaglani does not contain parallel alkoxy silane groups and silanol groups.

Reply Br. 5 (original emphasis omitted).

There are two threshold issues in this appeal. First, whether the Examiner has established that Mizutani would have inherently free radical polymerized the C=C double bonds in the silicone polyol resins by thermal energy. Second, whether the Examiner has established that one of ordinary skill in the art would have modified the binder of Gaglani by the teachings of Bergstrom to contain hydroxyl groups as required by claim 1.

The plain language of claim 1 pertinent to the issue specifies the composition applied and cured in the specified process contains any amount of any resin binders curable by thermal energy and moisture that have free radically polymerizable olefinic C=C double bonds, hydrolysable alkoxysilane groups and hydroxyl groups, wherein the binders have the stated "silicon content" and "the silicon is bound in alkoxysilane groups." The specified binder contains silicon only in the form of alkoxysilane groups. *See* Spec., e.g., 3:8 and 10-11 and 5:15-19, and claim 1 as originally filed; App. Br. 3. The hydroxyl groups can be at least two -OH groups attached in any manner to the binder except through silicon atoms, and can be functional to any extent, including reacting "with the alkoxysilane groups under condensation reaction." *See* Spec. 6:34-7:6. "The free-radically polymerizable olefinic double bonds and the hydrolysable alkoxysilane groups may . . . be present in the same binder and/or in separate binders." Spec. 3:26-28.

We find Mizutani would have disclosed to one of skill as well as one of ordinary skill in this art a process of using a resin composition comprising

a film-forming polyol resin having hydroxyl groups, a curing agent reactive with the polyol, a catalyst for the curing reaction, and a hydrolyzate polycondensate of a polyalkoxysilane. Mizutani, e.g., col. 2, ll. 9-20. Mizutani discloses the composition

> is a composite system comprising a silicate component and an organic resin component. When a coating film of the composition is formed . . . and then baked, the silicate component cures by itself through a self-condensation reaction forming essentially inorganic non-crystalline silica particles dispersed in the matrix of the organic resin component which cures through a reaction with an external curing agent. Beside this, it is postulated that a portion of hydroxyl groups of the resin component and a portion of alkoxysilyl or silanol groups of the silicate component react with each other to couple these components with chemical linkages in an integral film structure.

Mizutani col. 2, ll. 24-36. "The baking temperature will vary with the nature of particular curing agents employed and is generally from 140° C. to 240° C." Mizutani col. 14, ll. 16-18. The polyol resin can be a silicone polyol resins, that is, an organopolysiloxane, that can have alkoxysilane groups and carbon-to-carbon unsaturated functionality, that is, C=C olefinic double bonds, which "are used as a blend with other polyol reins." Mizutani col. 5, l. 47, to col. 6, l. 24. Mizutani discloses that

> [a]lternatively, all or a portion of other polyol resins may be reacted with the silicone polyol resin to chemically combine together. This method comprises the steps of reacting a hydroxyalkyl group-containing trisiloxane with an ethylenically unsaturated compound having a functional group such as maleic anhydride to introduce ethylenic unsaturation into the siloxane and then copolymerizing the product with an acrylic or vinyl monomer.

Mizutani col. 6, ll. 25-32.

We find Wu would have disclosed to one of ordinary skill in this art a hydrophobic porous membrane prepared from, among other things, a crosslinkable acrylate monomer which can be polymerized under thermal reaction conditions. Wu, e.g., abstract, col. 3, ll. 6-36, and col. 12, ll. 24-36.

We find Gaglani would have disclosed to one of ordinary skill in this art polyurethane binders curable by high energy radiation and moisture which are substituted by, among other things, hydrolysable alkoxysilane groups. Gaglani, e.g., col. 5, l. 5 to col. 7, l. 52. There is no specific disclosure that the binders contain hydroxyl groups attached to carbon or silicon. We find Bergstrom would have disclosed to one of ordinary skill in this art that moisture curable polyorganosiloxane compounds can contain, among other things, hydroxyl and alkoxy functional groups bonded to silicon atom(s). Bergstrom, e.g., col. 8, l. 30, to col. 9, l. 15, and col. 9, l. 49, to col. 10, l. 9. There is no dispute that it is well known in the art that alkoxysilane groups hydrolyze to silanol groups which condense to siloxane bridges.

Turning first to the grounds of rejection based on Mizutani and Wu under § 102(b), it is well settled that the Examiner has the burden of making out a *prima facie* case of anticipation in the first instance by pointing out where each and every element of the claimed invention, arranged as required by the claim, is described identically in the reference, either expressly or under the principles of inherency, in a manner sufficient to have placed a person of ordinary skill in the art in possession thereof. *See In re Spada*, 911 F.2d 705, 708 (Fed. Cir. 1990). It is also well settled that in order to establish that a claim element is inherent in the single prior art reference, it must be established by evidence that such limitation is necessarily present in

the description in the reference and that it would be recognized as such by one of ordinary skill in the art, as "[t]he mere fact that a certain thing may result from a given set of circumstances is not sufficient. (citations omitted)." *In re Oelrich*, 666 F.2d 578, 581 (CCPA 1981); *see also In re Robertson*, 169 F.3d 743, 745 (Fed. Cir. 1999) ("[T]he Board's analysis rests upon the very kind of probability or possibility – the odd use of fasteners with other than their mates – that this court has pointed out is insufficient to establish inherency."); *Continental Can Co. USA v. Monsanto Co.*, 948 F.2d 1264, 1268 (Fed. Cir. 1991) (silence in a reference about an inherent characteristic may be explained by extrinsic evidence which "must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill").

We cannot agree with the Examiner's position with respect to this ground of rejection. Even if the Examiner had initially established that prima facie one skilled in the art would have recognized that Mizutani's organopolysiloxane containing C=C olefinic double bonds would free radical polymerize with the application of thermal energy under the curing conditions taught by the reference in light of the evidence in Wu, Appellants carried their burden of rebutting the Examiner's position by pointing to evidence in Mizutani establishing that thermal energy was not necessarily and inherently the curing mechanism for this functionality. Thus, the burden shifted back to the Examiner to again establish that thermal energy in fact was the curing mechanism. *See, e.g., Spada*, 911 F.2d at 707 n.3. This, the Examiner did not do.

Accordingly, in the absence of a prima facie case of anticipation, we reverse the grounds of rejection of claims 1, 3, 5, and 6 under 35 U.S.C. § 102(b) as anticipated by Mizutani and Wu.

The Examiner relies on the same inherency theory with respect to the ground of rejection under § 103(a) based on these same references. *See, e.g.*, *In re Napier*, 55 F.3d 610, 613 (Fed. Cir. 1995) ("The inherent teachings of a prior art reference, a question of fact, arises both in the context of anticipation and obviousness." (citation omitted)). Thus, Appellants' arguments shifted the burden back to the Examiner in this instance as well. In light of the arguments advanced by Appellants, we determine the Examiner's contention that prima facie one of ordinary skill in this art would have conducted Mizutani's baking step at a temperature substantially lower than that disclosed in the reference based on Wu's teachings does not establish that a thermal cure mechanism would result, and thus, does not shift the burden back to Appellants. *See, e. g., In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992); *In re Piasecki*, 745 F.2d 1468, 1472 (Fed. Cir. 1984); *cf. In re Sebek*, 465 F.2d 904, 907 (CCPA 1972) ("Where the prior art disclosure suggests the outer limits of the range of suitable values, and that the optimum resides within that range, and where there are indications elsewhere that in fact the optimum should be sought within that range, the determination of optimum values outside that range may not be obvious.").

Accordingly, in the absence of a prima facie case of obviousness, we reverse the grounds of rejection of claims 1 through 6 and 9 under 35 U.S.C. § 103(a) as unpatentable over the combined teachings of Mizutani and Wu.

We also cannot agree with the Examiner's position with respect to the grounds of rejection based on the combined teachings of Gaglani and Bergstrom further combined with other references. As Appellants point out, claim 1 requires the initial composition contains a polyurethane binder having hydroxyl groups not bonded to a silicon atom. Thus, even if one of ordinary skill in this art would have modified Gaglani's polyurethane binder to contain silanol groups, that is, a hydroxyl group bonded to a silicon atom, based on the formation of the silanol intermediate in the synthesis of siloxane bridges, the same would fall outside of claim 1.

Accordingly, the Examiner has not established that the combination of Gaglani and Bergstrom would have resulted in a polyurethane binder required by claim 1, and thus, the Examiner has not established a prima facie case of obviousness within the meaning of 35 U.S.C. § 103(a). Therefore, we reverse the grounds of rejection of claims 1 through 6, 8, and 9 under this statutory provision.

The Primary Examiner's decision is reversed.

REVERSED

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